



## Combined and interactive effects of global climate change and toxicants on populations and communities

**Author(s):** Moe SJ, De Schamphelaere K, Clements WH, Sorensen MT, Van den Brink PJ, Liess M  
**Year:** 2013  
**Journal:** Environmental Toxicology and Chemistry / Setac. 32 (1): 49-61

### Abstract:

Increased temperature and other environmental effects of global climate change (GCC) have documented impacts on many species (e.g., polar bears, amphibians, coral reefs) as well as on ecosystem processes and species interactions (e.g., the timing of predator-prey interactions). A challenge for ecotoxicologists is to predict how joint effects of climatic stress and toxicants measured at the individual level (e.g., reduced survival and reproduction) will be manifested at the population level (e.g., population growth rate, extinction risk) and community level (e.g., species richness, food-web structure). The authors discuss how population- and community-level responses to toxicants under GCC are likely to be influenced by various ecological mechanisms. Stress due to GCC may reduce the potential for resistance to and recovery from toxicant exposure. Long-term toxicant exposure can result in acquired tolerance to this stressor at the population or community level, but an associated cost of tolerance may be the reduced potential for tolerance to subsequent climatic stress (or vice versa). Moreover, GCC can induce large-scale shifts in community composition, which may affect the vulnerability of communities to other stressors. Ecological modeling based on species traits (representing life-history traits, population vulnerability, sensitivity to toxicants, and sensitivity to climate change) can be a promising approach for predicting combined impacts of GCC and toxicants on populations and communities.

**Source:** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3601420>

### Resource Description

#### Communication: ☒

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

#### Communication Audience: ☒

audience to whom the resource is directed

Researcher

#### Exposure : ☒

weather or climate related pathway by which climate change affects health

# Climate Change and Human Health Literature Portal

Ecosystem Changes, Food/Water Quality, Food/Water Quality

**Food/Water Quality:** Biotxin/Algal Bloom, Chemical

**Geographic Feature:** 

resource focuses on specific type of geography

Freshwater, Ocean/Coastal

**Geographic Location:** 

resource focuses on specific location

Global or Unspecified

**Health Co-Benefit/Co-Harm (Adaption/Mitigation):** 

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

**Health Impact:** 

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

**Medical Community Engagement:** 

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

**Mitigation/Adaptation:** 

mitigation or adaptation strategy is a focus of resource

Adaptation

**Model/Methodology:** 

type of model used or methodology development is a focus of resource

Methodology

**Resource Type:** 

format or standard characteristic of resource

Review

**Resilience:** 

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

# Climate Change and Human Health Literature Portal

## **Timescale:**

time period studied

Time Scale Unspecified

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content